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REMARKS

Examiner is thanked for the recent Office action. Applicant has amended claims 1, 5, and 22, consistent with an agreement as noted in the "Interview" section, below. These amendments are believed to relieve the 101 rejections of any and all claims. Favorable reconsideration is respectfully requested.

All other claim rejections are hereby respectfully traversed. Favorable reconsideration is respectfully requested.

Interview of 10-30-2006

Examiner granted an interview to Applicant on Oct. 30, 2006. The 101 rejection was discussed with respect to claim 1, and the art rejections were also discussed with reference to claim 1.

Regarding the 101 rejections, Applicant offered the position that claim 1 does recite statutory subject matter because the claimed method steps would result in a tangible change--namely, the appearance of a line on a computer graphics display.

In a followup phone call on Friday, Nov. 3, 2006, Examiner Caschera said that the certain amendments (i.e., the ones made in this response) would alleviate the 101 rejections. Applicant has made such amendments, and they are presented in this response.

Regarding the art rejections, Applicant offered the position that Kubota does not appear to teach or suggest sampling patterns, as its teaching does not appear to be directed to antialiasing. Rather, Kubota appears to show how to interpret a continuous line as discrete coordinate points in a way that improves on the prior art by reaching a unique set of coordinate points for any given line

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no matter which end of the line is used as a starting point. Applicant respectfully submitted that Kubota does not appear to teach or suggest any antialiasing, nor does it appear to teach or suggest selection or use of sampling patterns or sub-pixel sampling patterns.

These arguments are presented more fully below.

35 USC 101

Claims 1-3, 5-12, and 22-30 are rejected under 35 USC 101 as being drawn to nonstatutory subject matter. The current amendments are believed to obviate the rejection, and these claims are now believed in condition for allowance. Favorable reconsideration is respectfully requested.

35 USC 102

All pending claims (1-3 and 5-30) are rejected under 35 USC 102, as anticipated by Kubota (USPN 5305432).

Claim 1 is reproduced for purposes of discussion:

1. A method for generating antialiased lines, comprising the actions of:
for each respective line, determining which of a plurality of orientation classes that entire line falls into; and
performing subpixel sampling using one of a plurality of multi-point sampling patterns, in dependence on which of said plurality of orientation classes that line falls into.

In rejecting claim 1, Examiner states in part,

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Kubota discloses comparing absolute differences in X and Y lengths of the line and based on such a result, discloses specific sampling formulas or patterns to obtain each (Xn, Yn) coordinate (columns 6-7, lines 48-5, column 7, lines 15-20 and column 2, lines 30-51). Note, since Kubota further discloses dealing with situations of fractional dot or pixel coordinates (see column 7, lines 20-46), the Office interprets Kubota to inherently perform subpixel sampling.

Applicant respectfully submits that the cited passages of Kubota do not teach or suggest the claimed limitations of, "performing subpixel sampling using one of a plurality of multi-point sampling patterns, in dependence on which of said plurality of orientation classes that line falls into," as claimed in claim 1.

Examiner says that Kubota inherently performs subpixel sampling. Applicant respectfully disagrees. Subpixel sampling is a part of antialiasing a line. Kubota does not appear to perform antialiasing, and does not appear to perform subpixel sampling as that term is known in the art and used in the present application.

Antialiasing and subpixel sampling are described in several places in the present application, such as at page 3, lines 10-19:

One common problem, inherent in a raster display system, is that of jagged or "aliased" edges. Aliasing is especially disconcerting at the edges of texture maps. Antialiasing or minimizing the appearance of jagged edges is important to implement in order to avoid this distraction. The effect is accomplished by reducing the contrast between the edge of an object and the color behind it by adjusting pixel values at the edge. This is often done by computing "subpixel" locations, within

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the area of a single pixel, so that the color values for pixels which overlap an edge are modified in approximate dependence on how much of the pixel falls on either side of the edge.

Kubota does not appear to address antialiasing. Kubota, instead, describes a way to depict line segments using Digital Differential Analysis. This is a method wherein continuous lines are represented in discrete spaces, using points on a grid to represent a line, in Kubota's examples, in display memory. Kubota does not describe antialiasing, but the efficient and unique selection of discrete points to represent a continuous line.

The present application, meanwhile, discusses and claims antialiasing, such as in the context of claim 1. The method of generating antialiased lines of claim 1, for example, includes the limitations of, "performing subpixel sampling using one of a plurality of multi-point sampling patterns, in dependence on which of said plurality of orientation classes that line falls into," as mentioned above. These limitations include mention of "subpixel sampling".

Subpixel sampling, like antialiasing, is neither taught nor suggested in Kubota. Subpixel sampling is a method whereby multiple points within a pixel are sampled so as to make a jagged line more smooth. The relative location(s) of the subpixel sample(s) determine what color to make that pixel so as to reduce artifacts in the displayed image.

Kubota does not deal with these problems or these solutions as presented in the present application. Kubota instead deals with a way to uniquely select a set of discrete points by which to represent a continuous line that must be stored in a discrete memory. For example, Kubota discusses this problem at columns 6 and 7, generally. Kubota's use of the Digital Differential

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Analyzer is intended to allow Kubota's system to avoid the problems stated at col. 3, lines 3-28:

The problem will specifically be explained with reference to FIG. 4. FIG. 4A illustrates, by black dots, an approximate line having the start point of (-2, -1) and the end point of (6, 3). approximate line is obtained by using a DDA mechanism adopting an error discrimination condition that when the error item is not less than 0.5, the carry-up is performed. On the other hand, FIG. 4B illustrates, by black dots, an approximate line having the start point of (6, 3) and the end point of (-2, -1), which is obtained by the same DDA mechanism. As seen from comparison between FIGS. 4A and 4B, the solid line of FIG. 4B is a simple replacement of the start point and the end point of the solid line of FIG. 4A by the end point and the start point, respectively, but the black dot patterns of FIG. 4A and 4B are not consistent. This means that the trace of the approximate line depicted or stored in the display memory is different. The line segment on the two-dimensional plane should be uniquely determined on the basis of two opposite ends of the line segment, without changing by exchanging the start point and the end point. However, if the trace of the approximate line depicted or stored in the display memory becomes different by exchanging the start point and the end point for the end point and the start point, respectively, an excessive load is given on a graphic software.

This passage is reproduced to show the dissatisfaction with the prior art and the problems addressed by Kubota--namely, that a single line segment can have two different trace representations based on which end the process begins with. Yet, the same line should be uniquely identified, not have two separate representations. This is the problem Kubota addresses.

This problem, it is noted, has nothing to do with aliased lines, and the solution offered by Kubota, has nothing to do with antialiasing those lines. Kubota deals with a process to find unique integer representations of a continuous entity.

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Examiner also says that, "Note, since Kubota further discloses dealing with situations of fractional dot or pixel coordinates (see column 7, lines 20-46), the Office interprets Kubota to inherently perform subpixel sampling."

Applicant respectfully disagrees. Kubota discusses a method of determining coordinates to discretely represent a continuous line. Because there is not exact match between discrete and continuous elements, some parts of a continuous line will fall between the discrete points of the grid. Hence, Kubota discusses the "sampling points" and fractions of those points.

However, this terminology does not refer to "subpixel sampling" as that term is used in both the art and in the present specification. The "sample points" of Kubota refer to actual discrete grid points used to represent the continuous line. Note that at col. 7, lines 21-22, Kubota lists several sampling points--all coordinates on the grid, or half coordinates. These are not a "sampling pattern" as that term is used in the present application.

The arguments presented above against Kubota are believed to apply to all currently rejected claims. Therefore, all claims are believed distinguished from the cited reference. Favorable reconsideration of the claims is respectfully requested.

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Conclusion

Thus, all grounds of rejection and/or objection are traversed or accommodated, and favorable reconsideration and allowance are respectfully requested. The Examiner is requested to telephone the undersigned attorney or Robert Groover for an interview to resolve any remaining issues.

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Respectfully submitted,



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